Active Trajectory Classification for Motion-based Communication of Robots

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Problem Set-up

The message sender sends a message by performing the corresponding trajectory chosen from the shared trajectory codebook.

Online State Estimation

The receiver is allowed to sequentially move around the sender to estimate the trajectory class as it observes the trajectories of the same class repeated by the sender.

Entrophy-based Control Policy

The control policy is formulated to minimize the conditional entropy over the joint distribution $p(r, m)$.

Simulation Results

Four different trajectory classes were used in the simulation. All the trajectories were assumed to be 2D.

Experimental Results

A 3D codebook was compiled from a human performer executing trajectories with an LED. The pose of the camera was manually controlled.

Conclusions

- Communication difficulties arising from monocular vision are addressed.
- Recursive Bayesian estimation combined with an entropy-based active control policy disambiguates the message sent to the receiver.

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